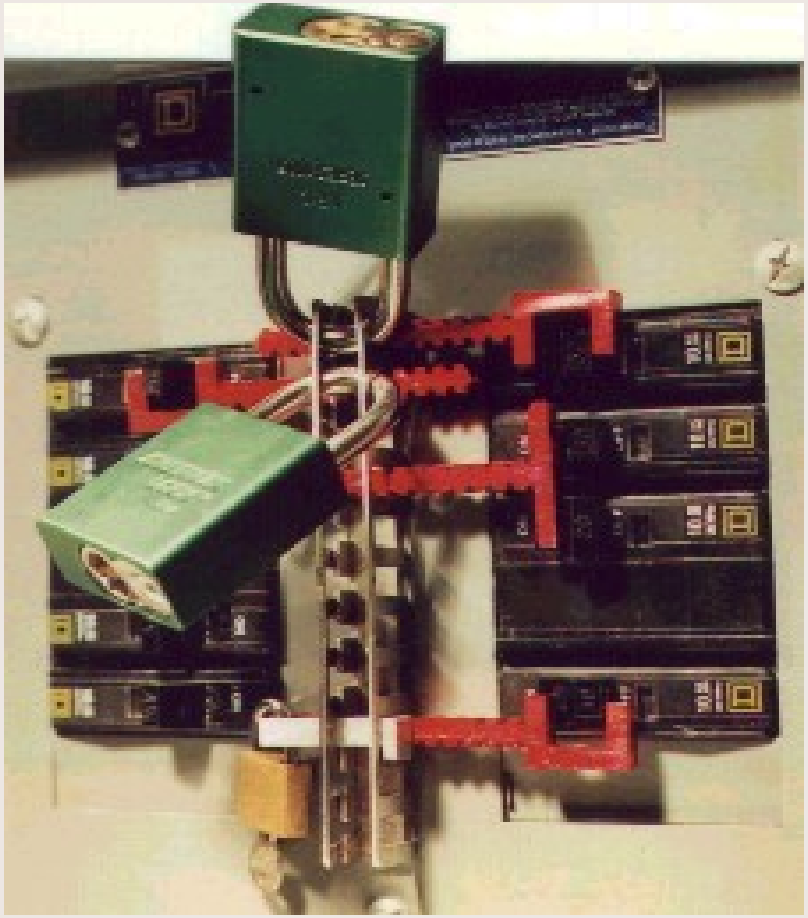
Lockout - Tagout

Control of Hazardous Energy

CFR 29 1910.147



You will learn…

- Purpose of Lockout-Tagout
- Requirements for LOTO
- Types of Hazardous Energy
- Procedures for LOTO

Types of Energy

- Electrical
- Mechanical
- Chemical
- Thermal
- Hydraulic
- Pneumatic

Electric Shock Can Kill

- **As little as 30 volts can carry enough current to kill**

Use Safe Electrical Practices

- **Use non-conducting tools**
- **Check circuits dead before working**
- **Lock & Tag source breakers not switches**
- **Ensure all control power is de-energized**
- **Discharge all capacitors after Lockout**

Mechanical Energy Hazards

2 Types

- Kinetic – in motion
- Potential - stored

Kinetic Energy Hazards

Energy of moving machinery can cause

- **Amputations**
- **Lacerations**
- **Fractures**
- **Loss of life**

Potential Energy Hazards

- ✓ **Energy stored in machinery**
- ✓ **Weights & Springs**
- ✓ **Pistons under pressure**
- ✓ **Hydraulic controls**

Stored potential energy can be released during work causing injury or death

Chemical Energy Hazards

Chemicals have energy that can

- **start fires**
- **cause skin burns**
- **generate harmful gases or fumes**

Before working – release, drain or vent chemicals safely

Thermal Energy Hazards

Energy of Heat (and cold)

- **Hot equipment & fluids will burn you**
- **Cold fluids can cause injury also**
- **Quick release of compresses gases can freeze your skin**
- **Allow equipment to reach a safe temperature before starting work.**

Hydraulic Energy

Energy of Liquids Under Pressure

- pressure can cause equipment to move
- rapid release can cause injury
- or ejection of system parts

Relieve pressure slowly into a proper container

Pneumatic Energy Hazards

Energy of Compressed Gases

- uncontrolled release can cause injury
- rapid de-pressurization creates extreme low temperature

Properly vent all systems before starting work

First Step In LOTO

Know your equipment & systems

- **hazards**
- **isolation points**
- **procedure for Lockout**

Working on unfamiliar machinery is a hazard

Who Can Lockout Equipment?

Only Employees who have been trained and authorized by management

Items needed for LOTO

- Written LOTO SOP
- Locks & Tags - identified to the worker
- Hasps - for placing locks & tags
- Breaker Clips - for electrical LOTO
- Blank Flanges (pancakes)- for fluid lines
- Valve Covers - for LOTO of Valves
- Plug Buckets - for electrical plugs

Use of Locks & Tags

- Use only those issued to you
- Never use another workers lock or tag
- Ask your supervisor if you need more LOTO equipment

6 Step LOTO Procedure

- Prepare for Shutdown
- Shutdown Equipment
- Isolate all energy sources
- Place Locks & Tags
- Release Stored Energy
- Verify Equipment Isolation

1. Prepare for Shutdown

Understand equipment hazards

Notify other workers of shutdown

2. Shutdown Equipment

- Use normal shutdown procedure
- Turn all switches to OFF
- Shut all control valves
- Disable all sources of energy

3. Isolate All Energy Sources

- **Shut valves**
- **Open breakers & disconnects**

4. Place Locks & Tags on

- Valves
- Breakers/electrical disconnects
- Block or disconnect all lines
- Lock and tag blank flanges

5. Release or Block all Stored Energy

- ✓ Discharge capacitors
- ✓ Block or release springs
- ✓ Block elevated parts
- ✓ Stop rotating flywheels
- ✓ Relieve system pressure
- ✓ Drain fluids
- ✓ Vent gases
- ✓ Allow system to cool

6. Verify Equipment Isolation

- Check all other workers are clear
- Check locking devices securely placed
- Check isolation
- Attempt normal startup
- Return Controls to OFF/Neutral

Release from LOTO

- Inspect Area and Equipment
- Ensure all Machine Guards in place
- Move tools away from equipment
- Inform others of startup
- Restore system connections
- Remove Locks & Tags
- Restore equipment to normal
- Conduct normal startup

Who can remove Locks & Tags?

Only the employee who placed the tag

or

a supervisor, after obtaining permission from the worker who placed the tag

A piece of equipment already has a lock and tag. Do I have to place my own locks & tags?

YES. Each person working on the equipment must place their own locks and tags to ensure their safety.

Lockout-Tagout Protects YOU!

USE Proper Lockout - Tagout Procedures

Please be careful when working on equipment